



## Deciding when a picture is worth a thousand words and several thousand dollars

The costs of medical care in the United States are clearly out of line with those in other high-income countries. In a recent analysis,<sup>1</sup> Papanicolas et al noted that despite comparable utilization of services, costs were far higher in the United States. Notably high were our administrative costs (accounting for almost 8% of spending), our use of imaging studies, and the cost of those studies. While many clinicians are troubled by the seemingly massive growth of administrative personnel and functions and would like to significantly shrink both, the path to reducing costs of imaging (and of testing in general) is fraught with potholes related to clinical care.

In a study from the University of Pennsylvania,<sup>2</sup> Sedrak et al surveyed residents about their lab test ordering practices. Almost all responders recognized that they ordered “unnecessary tests.” The authors of the paper probed to understand why, and strikingly, the more common responses were the same that my resident peers and I would have given 4 decades ago: the culture of the system (“We don’t want to miss anything or be asked on rounds for data that hadn’t been checked”), the lack of transparency of cost of the tests, and the lack of role-modeling by teaching staff. There has been hope that the last of these would be resolved by increased visibility of subspecialists in hospital medicine, well-versed in the nuances of system-based practice. And the Society of Hospital Medicine, along with the American College of Physicians and others, has pushed hard to promote choosing wisely when ordering diagnostic studies. But we have a way to go.

Lab tests represent a small fraction of healthcare costs. Imaging tests, especially advanced and complex imaging studies, comprise a far greater fraction of healthcare costs. And here is the challenge: developers of new imaging modalities are now able to design and refine specific tests that are good enough to become the gold standard for diagnosis and staging of specific diseases—great for clinical care, bad for cost savings. One need only review a few new guidelines or clinical research protocols to appreciate the successful integration of these tests into clinical practice. Some tests are supplanting the need for aggressive biopsies, angiography, or a series of alternative imaging tests. This is potentially good for patients, but many of these tests are strikingly expensive and are being adopted for use prior to full vetting of their utility and limitations in large clinical studies; the cost of the tests can be an impediment to conducting a series of clinical studies that include appropriate patient subsets. The increasingly proposed use of positron emission tomography in patients with suspected malignancy, inflammation, or infection is a great example of a useful test that we are still learning how best to interpret in several conditions.

In this issue of the *Journal*, two testing scenarios are discussed. Lacy et al (page 515) address the question of when patients with pyelonephritis should receive imaging studies. There are data to guide this decision process, but as noted in the study by

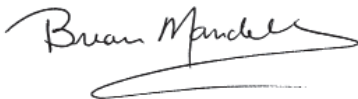
doi:10.3949/ccjm.86b.08019

Sedrak et al,<sup>2</sup> there are forces at work that challenge the clinician to bypass the rational guidelines—not the least of which are the desire for efficiency (don't take the chance that the test may be required later and delay discharge from the hospital or observation area) and greater surety in the clinical diagnosis. Although fear of litigation was not high on Sedrak's list of reasons for ordering more “unnecessary” tests, I posit that a decrease in the confidence placed on clinical diagnosis drives a significant amount of imaging, in conjunction with the desire for shorter hospital stays.

The second paper, by Mgbojikwe et al (page 559), relates to the issue of which advanced technology should be ordered, and when. They review the limitations of traditional (echocardiographic) diagnosis and staging of infective endocarditis, and discuss the strengths and limitations of several advanced imaging tools in the setting of suspected or known infectious endocarditis. I suspect that in most medical centers the decisions to utilize these tests will rest with the infectious disease, cardiology, and cardiothoracic surgery consultants. But it is worth being aware of how the diagnostic and staging strategies are evolving, and of the limitations to these studies.

We have come a long way from diagnosing bacterial endocarditis with a valve abscess on the basis of finding changing murmurs, a Roth spot, a palpable spleen tip, new conduction abnormalities on the ECG, and documented daily afternoon fevers. Performing that physical examination is cheap but not highly reproducible. The new testing algorithms are not cheap but, hopefully, will offer superior sensitivity and specificity. Used correctly—and we likely have a way to go to learn what that means—these pictures may well be worth the cost.

Although someone still has to suspect the diagnosis of endocarditis.



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1. Papanicolas I, Woskie LR, Jha AK. Health care spending in the United States and other high-income countries. *JAMA* 2018; 319(10):1024–1039. doi:10.1001/jama.2018.1150
2. Sedrak MS, Patel MS, Ziemba JB, et al. Residents' self-report on why they order perceived unnecessary inpatient laboratory tests. *J Hosp Med* 2016; 11(12):869–872. doi:10.1002/jhm.2645